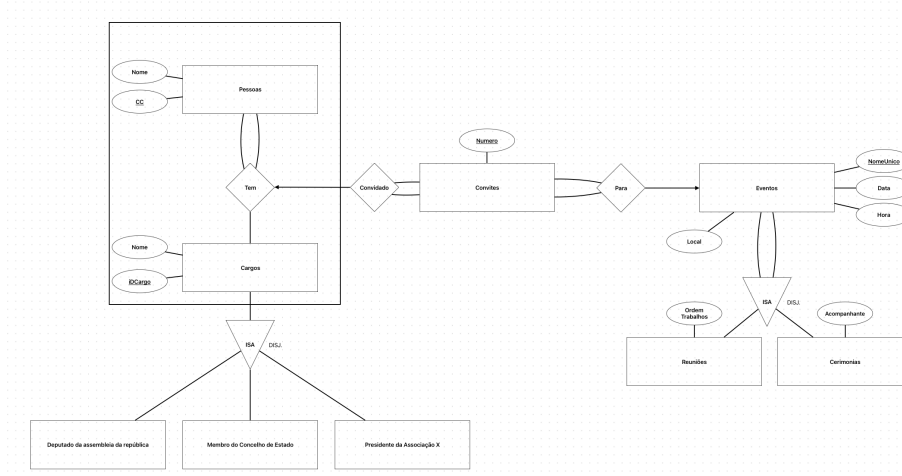


Teste 2021/2022

Questão 1



Questão 2

(a)

$A(\underline{a_2}, a_1, n, b_1)$, $\underline{a_2}$ é chave primaria. $\underline{a_2}$ e b_1 chave estrangeira de D. n é chave estrangeira?

$B(\underline{b_1}, \underline{a_2}, b_2)$, $\underline{b_1}$ e $\underline{a_2}$ são chave primaria. a_2 é chave estrangeira de A.

$C(\underline{c_1}, c_2, c_3)$, $\underline{c_1}$ é chave primaria.

$D(\underline{b_1}, \underline{a_2}, d_1, d_2)$, $\underline{b_1}$ e $\underline{a_2}$ são chave estrangeira de B.

$E(\underline{b_1}, \underline{a_2})$, $\underline{b_1}$ e $\underline{a_2}$ são chave estrangeira de B.

$F(\underline{b_1}, \underline{a_2})$, $\underline{b_1}$ e $\underline{a_2}$ são chave estrangeira de B.

$R_2(\underline{b_1}, \underline{a_2}, \underline{c_1})$, $\underline{b_1}$, $\underline{a_2}$ e $\underline{c_1}$ são chave primaria. $\underline{b_1}$, $\underline{a_2}$ são chave estrangeira de B.

$\underline{b_1}$, $\underline{a_2}$ são chave estrangeira de F.

$R_5(\underline{b_1}, \underline{a_2})$, $\underline{b_1}$ e $\underline{a_2}$ são chave primaria. $\underline{b_1}$, $\underline{a_2}$ são chave estrangeira de D. $\underline{b_1}$, $\underline{a_2}$ são chave estrangeira de E.

Questão 3

(a)

$$\Pi_{idc,matricula}(obra \bowtie maoObra \bowtie funcionarios) \div \Pi_{idc}(categorias)$$

(b)

$$\Pi_{name}((\Pi_{ido}(obra) - \Pi_{ido}(saidas)) \bowtie (maoObra \bowtie funcionarios))$$

(c)

$$r_1 \leftarrow (obra \bowtie maoObra)$$

$$\Pi_{r_1.matricula}(\sigma_{r_1.matr=r_2.matr \wedge r_1.ido \neq r_2.ido \wedge r_1.cc=r_2.cc}(r_1 \times \rho_{r_2}(r_1)))$$

(d)

```
select count(distinct CC)
  from maoObra natural inner join saidas natural inner join obras
 where Matr = 01-01-AA;
```

(e)

```
select horas x precoHora as total
  from (saidas natural inner join maoObra natural inner join
        funcionarios natural inner join categorias)
 order by total desc;
```
